Multiple Sclerosis and the Hepatitis B Vaccine

At a glance: Studies have been completed which evaluate possible relationships between hepatitis B vaccination and multiple sclerosis (MS). The weight of the available scientific evidence does not support the suggestion that hepatitis B vaccine causes or worsens MS or other demyelinating diseases.

Related topics/pages:
Institute of Medicine report on Hepatitis B Vaccine and Demyelinating Neurological Disorders (released May 30, 2002)

What is multiple sclerosis (MS)?

Multiple sclerosis (MS) is a disease of the central nervous system characterized by the destruction of the myelin sheath surrounding neurons, resulting in the formation of "plaques." Because they involve the destruction of the myelin sheath that covers nerve tissue, diseases such as MS are known as "demyelinating" diseases. MS is a progressive and usually fluctuating disease with exacerbations (patients feeling worse) and remissions (patients feeling better) over many decades. Eventually, in most patients, remissions do not reach baseline levels and permanent disability and sometimes death occurs. The cause of MS is unknown. The most widely held hypothesis is that MS occurs in patients with a genetic susceptibility and is "triggered" by certain environmental factors. MS is 3 times more common in women than men, with diagnosis usually made as young adults.
The concern that hepatitis B vaccination may cause MS or exacerbate it derived from case reports in France in which some individuals developed MS following hepatitis B vaccination (Herrolen, 1991). The French media rapidly picked up on the alleged association and the issue was also on televised news reports in the United States. Concerns that hepatitis B vaccination may cause or precipitate MS have disrupted immunization programs in France and elsewhere. Recently, controlled studies have been completed which evaluate any possible relationship between hepatitis B vaccination and MS.

Does hepatitis B vaccination cause MS?

The weight of the available scientific evidence does not support a causal relationship between hepatitis B vaccination and MS or other demyelinating diseases:
Extensive pre-licensure clinical trials did not document such an effect.

Given the large number of vaccinations administered worldwide, it is not surprising that surveillance systems in the U.S., France, and elsewhere (Quast, 1991), have received some reports of MS temporally (coincidentally) associated with vaccinations. As with all such case reports, however, they only constitute signals of possible causal associations.

Further controlled studies are necessary to establish causation.

Hundreds of millions of persons worldwide have received hepatitis B vaccine without developing MS (or any other autoimmune disease). This finding provides important negative evidence as well as an appropriate framework for assessing this possible association– namely, that if vaccination causes MS, it does so extremely rarely.

A case-control study was conducted using CDC's Vaccine Safety Datalink project to assess the association between hepatitis B vaccination and demyelinating diseases such as MS and optic neuritis among members of three large managed care organizations (MCOs) on the West Coast of the US (Verstraeten, 2001). The study included 422 cases (people with demyelinating disease) and 921 matched controls (people of similar age, gender, and MCO status who did not have demyelinating disease). The odds ratio for ever being vaccinated against hepatitis B prior to onset of demyelinating symptoms was 1.09 (95% CI: 0.70-1.70). The researchers concluded that hepatitis B vaccination was not associated with demyelinating disease in the study population.

Ascherio and colleagues (2001) evaluated the possible association between hepatitis B vaccination and MS in a case-control study. The study included 192 women with MS and 645 controls. The relative risk associated with hepatitis B vaccination at any time before onset of MS and within 2 years of onset was 0.9 and 0.7 respectively. The authors concluded that there was no association between hepatitis B vaccination and MS.

A case crossover study was conducted in Europe to evaluate whether MS relapses were associated with receipt of hepatitis B, tetanus, or influenza vaccines (Confavreux, 2001). The study included 643 individuals with relapsing MS. The relative risk of relapse during the two-month period following hepatitis B vaccination was 0.67 and not significantly different compared with the control period, which ranged from 2-12 months preceding the vaccination. The researchers concluded that there is no evidence of an association between recent receipt of hepatitis B, vaccine (or tetanus, or influenza vaccination) and MS relapses.

Sadovnick and Scheifele (2000) investigated multiple sclerosis in 578,308 adolescents in British Columbia before and after a hepatitis B vaccination program was begun. The authors found no evidence of a link between hepatitis B vaccination and multiple sclerosis or other demyelinating disease.

An analysis of a U.S. pharmacy benefits management database did not find a statistically significant association between claims for hepatitis B vaccination and subsequent claims for treatment of CNS demyelinating disorders (Zipp, 1999).

Two European case-control studies (Sturkenboom, 1999; Fourrier, 1999) evaluated vaccination as a trigger for demyelination. They found relative risks around 1.5 that were not statistically significant for onset of demyelination within 2 months to 1 year of hepatitis B vaccination.

What more is being done to examine the suggested association between Hepatitis B vaccine and neurological disorders?

The Centers for Disease Control and Prevention (CDC) and the National Institutes of Health (NIH) asked the National Academy of Sciences, Institute of Medicine (IOM) to establish an independent expert committee to review hypotheses about existing and emerging immunization safety concerns. These reviews involve an assessment of factors such as the biologic mechanisms of the hypothesis, competing alternative hypotheses, as well as the available scientific evidence to date. The IOM committee recently reviewed the hypothesized association between Hepatitis B vaccine and neurological disorders. The full report with conclusions and recommendations can be viewed at http://www.nap.edu/books/0309084695/html/index.html
For more information on the IOM Immunization Safety Review Committee go to http://www.iom.edu/imsafety

Should I delay hepatitis B vaccination until more is known?

No. Results from studies that have examined the possible association between hepatitis B vaccination and MS are reassuring and support current recommendations for immunizing against hepatitis B. Concern regarding the alleged association between hepatitis B vaccination and MS must be weighed against the vaccine's ability to prevent risks associated with hepatitis B virus infection. For general information on hepatitis B and hepatitis B vaccine, go to www.cdc.gov/ncidod/diseases/hepatitis/b/index.htm

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